

ABSTRACT

The invention provides methods used to analyze the contents of a biological sample, such as blood serum, with cascade Raman sensing. A fluorescence producing nanoporous biosensor having probes that bind specifically to known analytes is contacted with a biological sample and one or more bound complexes coupled to the porous semiconductor structure are formed. The bound complexes are contacted with a Raman-active probe that binds specifically to the bound complexes and the biosensor is illuminated to generate fluorescent emissions from the biosensor. These fluorescent emissions generate Raman signals from the bound complexes. The Raman signals produced by the bound complexes are detected and the Raman signal associated with a bound protein-containing analyte is indicative of the presence of the protein-containing compound in the sample. The invention methods are useful to provide a protein profile of a patient sample. The invention also provides detection systems useful to practice the invention methods.